

**MEMORANDUM OF UNDERSTANDING**  
**BETWEEN**  
**THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA**  
**AND**  
**QATAR FOUNDATION FOR EDUCATION, SCIENCE AND COMMUNITY DEVELOPMENT**  
**ON CLEAN ENERGY COOPERATION**

The Department of Energy of the United States of America and the Qatar Foundation for Education, Science and Community Development, on behalf of Qatar Science & Technology Park, hereinafter referred to as the "Participants",

**WISHING** to invigorate cooperation in the development and deployment of renewable energy through both bilateral and multilateral engagement;

**ACKNOWLEDGING** the importance of enabling environmentally friendly and cost-effective technologies through alternative energy research and development, increasing renewable energy efficiency, improved cooling technologies, carbon capture and sequestration techniques, water desalination and sustainable water purification systems;

**TAKING INTO ACCOUNT** the history of cooperative bilateral relations between the United States of America and Qatar;

**REAFFIRMING** the desire to work collaboratively to ensure that the global energy economy operates on terms that are commercially and sustainably driven;

**ACKNOWLEDGING** the common goals and responsibilities to address climate change; and

**DECLARING** the intention that their cooperation should reinforce and complement joint participation in multilateral partnerships to achieve clean energy development and use and shared climate change goals,

**HAVE REACHED THE FOLLOWING UNDERSTANDING:**

## SECTION 1

### OBJECTIVE

The purpose of this Memorandum of Understanding (MOU) is to establish a framework for mutually beneficial energy cooperation in the areas listed in Section 2 between the Department of Energy (DOE), through the Advanced Research Projects Agency – Energy (ARPA-E), and Qatar Foundation for Education, Science and Community Development on behalf of Qatar Science & Technology Park (QSTP).

## SECTION 2

### AREAS OF COOPERATION

1. Priority areas of cooperation may include the following:

#### Advanced Cooling Technologies

- Active Thermal Systems
  - Development of next-generation cooling technologies, including a decentralized cooling system.
  - Systems Integration and building controls and interface with the electric grid.

#### Cost Effective Renewable Power Generation

- Development of cost-effective integrated photovoltaic systems.
- Development of coatings to reduce the effect of weather conditions.

#### Energy Storage

- High energy density and cost effective electric storage for grid and vehicle applications.
- Thermal storage for combined heat and power systems and high-temperature solar-thermal plants.

#### Carbon Capture and Sequestration

- Carbon Capture
  - Improving the efficiency (usage and capital-cost requirement) of existing technologies such as amines-based technology.
  - Development of next-generation technologies such as solid absorption, membrane, cryogenic, which are expected to yield a significant technological and cost improvement over existing technology.

- Transportation of CO<sub>2</sub>
  - Safe and efficient transportation of high-pressure CO<sub>2</sub>.
- CO<sub>2</sub> Storage
  - Development of effective long-term storage media/systems.

#### Water

- Development of efficient and cost-effective desalination techniques (for example, forward and reverse osmosis).
  - Development of effective water purification techniques.
2. The areas of cooperation may be expanded by the written consent of the Participants.
  3. The Participants plan to identify a phased program of mutually decided priority activities.

### **SECTION 3**

#### **FORMS OF COOPERATION**

The forms of bilateral and multilateral cooperation in the framework of this MOU may include:

1. Exchanges of scientific and technical information as well as information on clean energy policy;
2. Organization of seminars, workshops, and other events on mutually determined topics;
3. Exchanges of experts, engineers, scientists, and other specialists as jointly determined, including those from industry and other non-governmental sectors;
4. Visits by a Participant's specialist teams or experts to the facilities of the other Participant, including field visits to research labs and industrial sites, for the exchange of technical information and experience;
5. Identification of areas and projects suitable for the possible future conduct of joint research and development and realization of pilot-scale and commercial-scale projects;

6. Facilitation of the ability of the Participants, together with other public and private entities, to make investments or provide follow-on co-funding to the mutually decided priority activities identified as per Section 2.3;
7. Promotion of the potential for DOE to have fast-track demonstration and deployment opportunities in Qatar with support from QSTP; and
8. Other forms of cooperation as determined in writing by the Participants at a later time.

#### **SECTION 4**

##### **COORDINATION**

1. **Principals.** Activities within the framework of this MOU are to be led by the U.S. Deputy Secretary of Energy and the Executive Chairman, Management Board, QSTP.
2. **Coordinators.** Principals are to designate Coordinators to coordinate activities to implement cooperative activities within this MOU.
3. **Interaction.** The Principals and/or Coordinators may interact directly and/or through subsidiary bodies, such as expert groups created as appropriate, to advise and consult on priority areas for cooperation under this MOU.
4. **Work Plan.** Implementation of this MOU is to be based on a detailed work plan which the Coordinators are to present to the Principals for approval within six months of signing the MOU.
5. **Reporting.** The Coordinators are to report quarterly to the Principals on cooperative activities being conducted under this MOU.
6. **Annual Review.** The Principals or their designees should meet at least once a year to review progress of cooperation under this MOU.

## **SECTION 5**

### **PARTICIPATING ORGANIZATIONS**

Each Participant may invite representatives from other government agencies or organizations in its respective country, including national laboratories or research centers or Members of QSTP, to participate in the activities in this MOU, at those additional entities' own expense.

## **SECTION 6**

### **GENERAL CONSIDERATIONS**

1. Each Participant is responsible for the costs of its participation in all cooperative activities carried out in the framework of this MOU, unless specified otherwise in writing.
2. The conduct of cooperative activities under this MOU is subject to the availability of funds, technical resources, and personnel.
3. In the event cooperative activities under this MOU involve the transfer of business-confidential information, the Participants intend to conclude appropriate written non-disclosure agreements for the protection of such information.
4. Each Participant is to conduct the cooperative activities under this MOU in accordance with applicable laws and regulations, and applicable international agreements to which its government is party.
5. This MOU does not create any legally binding obligations between the Participants.

## **SECTION 7**

### **COMMENCEMENT, MODIFICATION, EXTENSION, AND DISCONTINUATION**


1. This MOU may commence on the date of its signature and continue for five years, unless discontinued earlier in accordance with Section 7.4.
2. This MOU may be modified or extended by mutual determination of the Participants in writing.

3. The Participants may discontinue this MOU at any time by mutual determination in writing.
4. A Participant that desires to discontinue its participation in this MOU should endeavor to give the other Participant at least ninety (90) days advance written notice.

Signed at New York, in duplicate, this 6<sup>th</sup> day of April 2011.

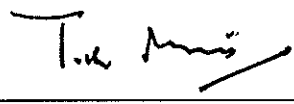
FOR THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA:

By:

  
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Daniel B. Poneman  
Deputy Secretary

FOR THE QATAR FOUNDATION FOR EDUCATION, SCIENCE AND COMMUNITY DEVELOPMENT:

By:

  
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Dr. Tidu Maini  
Executive Chairman  
Management Board  
Qatar Science & Technology Park